

Cytological Screening for Cancer in a Venereal Disease Program

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PUBLIC clinics established for diagnosis and treatment of venereal disease have a unique opportunity and obligation to initiate programs to screen female patients for early cancer of the genital tract. Impetus for such a program in Seattle-King County, Wash., arose from the assumption that this population group was not receiving adequate cancer prevention care. Since the women were being admitted to the clinic service for diagnosis and treatment of possible venereal disease, relatively little additional medical effort would be required to screen them for cancer of the cervix and uterus by exfoliative cytology. A practical screening program, however, would require effective followup on final diagnosis and treatment as most of the patients were known to be medically indigent or semi-indigent.

The proposed program, as endorsed by the local medical society, called for screening only the female population which ordinarily attended the Seattle-King County venereal disease clinic. We were not interested in changing our clinic to a community cancer detection center. The program would be primarily a demonstration project. Such considerations called for initiation of the program without widespread public announcements. The medical profession

was notified through the local medical society bulletin.

In the belief that adequate evaluation should be part of a new program, protocol to provide this was developed in mid-1961. Its primary purpose was to determine whether the program would be sufficiently promising to adopt on a permanent basis. A 2-year interval, 1961-63, was accepted as an adequate trial period. Since there were no similar clinics in the community to serve as an alternate program for comparison, we proposed to use results of other screening programs as criteria of satisfactory yield. Dunn and Sprunt (1), reporting on mass surveys in Tennessee during 1952, showed a prevalence rate of 8 cases of cervical-uterine cancer per 1,000 women screened. Dahlin and associates (2) in 1955 obtained a prevalence rate of 8.9 per 1,000 women screened for the first time. Because of the special followup difficulties we anticipated with our patients, an arbitrary figure of 4 cases of early carcinoma (with adequate followup treatment) per 1,000 women screened was selected as a realistic goal.

Criteria for the monetary cost of screening were more difficult to establish. There was no accurate way to assess personnel time required since no additional employees were provided. The Washington State Health Department allocated sufficient funds, \$11,000, to cover the primary additional expense of the program, the cost of processing and reading cytology slides. Our budget allocated this sum in a fixed yearly commitment of \$5,500 (regardless of the number of cytological specimens). The sum of

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\$11,000 was divided by the number of patients screened to arrive at the average screening cost per screenee and, by the number of positive cancer cases uncovered, to calculate the cost of bringing each new cancer patient found to treatment.

Group Screened

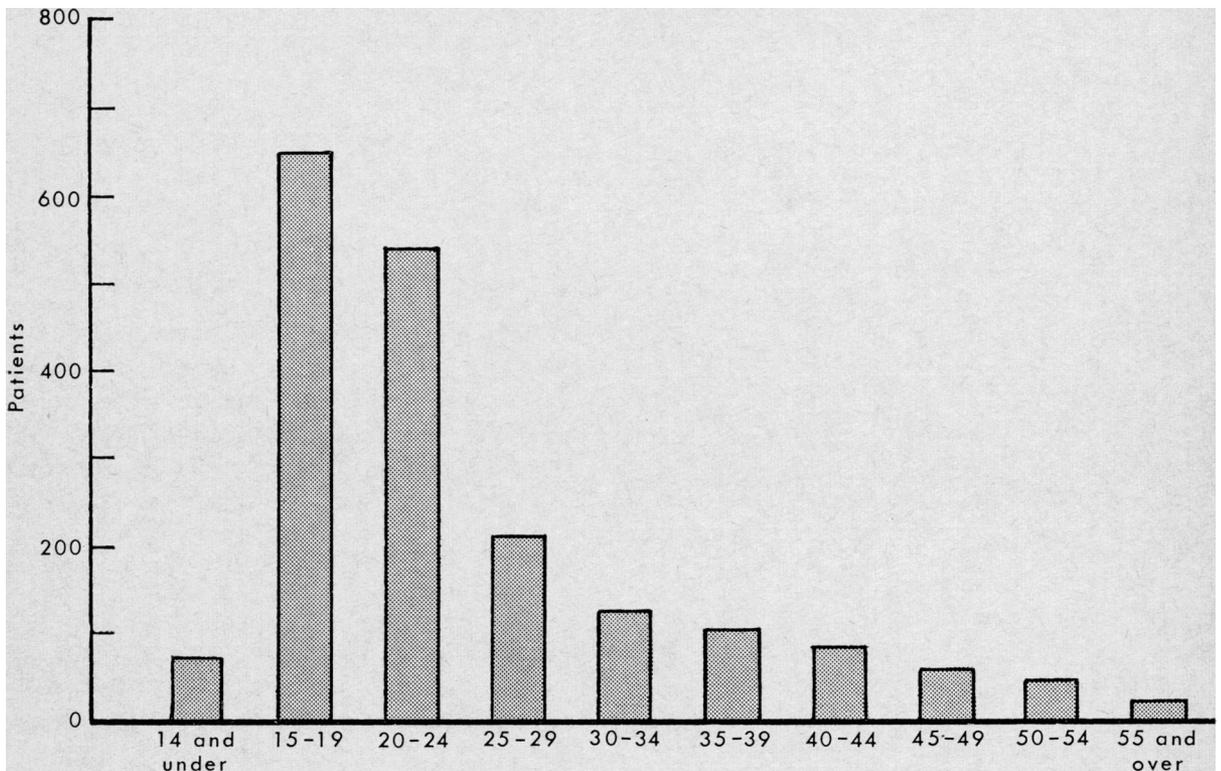
The 1,885 female patients admitted for clinic service came from four main sources: 749 (39.5 percent) were brought in as named contacts of persons with venereal disease; 726 (39.0 percent) were referred from private sources; 384 (20 percent) were self-referrals; 26 (1.5 percent) were referred from jail. Attendance at the clinic of the large number of patients brought in as named contacts of persons with venereal disease and of a small number of jail patients cannot be considered voluntary since these groups were not personally motivated to have the diagnostic tests.

The private referral category appears disproportionately large, but it includes referrals

from private hospital prenatal clinics in Seattle caring for unwed mothers as well as from institutions for juvenile delinquents. Private patients referred for diagnosis of venereal disease were also screened for cancer. When cytology revealed abnormalities, the private patients were promptly sent back to their own physicians for followup if the physicians so desired. Two patients with carcinoma in situ who had been screened originally in the clinic were cared for by the referring physicians. In most instances, however, the referring physician or institution requested that we follow through on suspicious cytological slides. This included arrangements for hospitalization when needed.

The median age of patients screened was between 20 and 24 years. The chart shows the age distribution. This group is younger than the age groups receiving emphasis in cancer prevention. Because in many types of cancer risk increases with advancing age, women in the younger age group generally do not seek examinations and physicians have often limited screening to women 35 years or older. In the

Age distribution of 1,885 patients screened



Strang Cancer Prevention Clinic, Day (3) reported a great predominance of the 25,000 women screened in a 2-year period (1954-56) were between 35 and 55 years of age. Kelso and Funnel (4) have pointed out that in cervical carcinoma discrimination against younger age groups is not advisable. Their findings during 2 years of taking Papanicolaou smears on women 35 years or older caused them to recommend including all women more than 20 years of age.

The large majority of our patients, 1,232 (65 percent), were white; 390 (21 percent) were nonwhite; 243 (13 percent) were Indian; 20 (1 percent) were of other ethnic groups (for example, Mexicans and Orientals). Both Negro and Indian groups were disproportionately large compared with their proportions in the population of the Seattle metropolitan area. The U.S. census of 1960 shows that approximately 3 percent of the residents of Seattle and King County were Negroes; 2.5 percent were listed under "Others" (which includes Indians).

The majority of the Indian patients were transients, passing through the city from one temporary job to another. Because they were highly mobile, this group contributed 30 percent of the patients lost from study. Mobility is characteristic of our clinic patients as a whole. Frequent changes of address and of name and uncertainties about age are common.

Data on a patient's past or present venereal disease infection were obtained from her clinic record and a special questionnaire. Much of this information on past history is subjective and therefore of doubtful reliability. Table 1

Table 1. Gynecological infections of the 1,885 women screened, based on history and clinic records

Disease	Present		Past	
	Number	Percent	Number	Percent
No diagnosed disease.....	1, 085	57. 5	1, 457	77. 5
Gonorrhoea.....	604	32. 5	328	17. 2
Syphilis (all stages).....	30	1. 5	77	4. 1
Trichomonas.....	158	8	22	1
Other (moniliasis).....	8	. 5	1	. 2
Total.....	1, 885	100	1, 885	100

Table 2. Sexual history pattern of 1,885 women screened, based on clinic records and questionnaire

Number of experiences	Number of patients		
	Marriage	Pregnancy	Male sex contacts outside marriage
0.....	1 888	1 463	1 86
1.....	700	614	516
2.....	212	249	256
3.....	60	184	199
4.....	16	108	160
5.....	5	100	122
6.....	4	64	63
7 or more.....	0	103	483

¹ Denied having this sexual experience.

NOTE: If a patient refused to talk about her sexual history but was obviously pregnant when seen, she was given credit for at least one pregnancy and at least one male sex contact (if she denied being married).

Table 3. Occupational history of 1,885 women screened

Occupation	Number	Percent of total
Housewife.....	429	23
Skilled—sales clerk, secretary, and other.....	301	16
Unskilled—babysitter and other.....	209	11
Waitress, barmaid, and other.....	202	10
Admitted prostitutes.....	5	1
None given.....	366	19

shows the extent of gynecological infections present at the time of clinic examination and lists past infections as obtained from the history given by the patient. Although no disease was diagnosed in 1,085, nonspecific vaginitis was frequently suggested on the basis of the cytological reports. Only 7 percent of the patients' smears were interpreted as class I (negative).

At the time of screening, 546 women (28 percent) were pregnant, the majority of these unmarried and in their teens or early twenties. Surprisingly, in these pregnant women no venereal disease was encountered. Seven class II (atypical) smears were found which required a

recheck after parturition. No cases of carcinoma were diagnosed in this group.

Data on the sexual experience of the 1,885 patients screened (table 2), combined with information given by 1,634 of these patients as to age at first sexual intercourse, provide further evidence of the group's promiscuous sexual behavior pattern:

<i>Age (years) at first intercourse</i>	<i>Number of patients</i>
0-14 -----	532
15-19 -----	967
20-24 -----	124
25-29 -----	11
29 and older -----	0
Refused to give information -----	251

Approximately 13 percent of the 1,885 patients refused to give requested information on age when they first experienced intercourse, 47 percent denied ever having been married, 24 percent denied ever experiencing pregnancy, but only 4.5 percent denied having sexual intercourse sometime during their life.

Table 3 provides occupational information on the women screened as tabulated from the questionnaire. A look at their occupational history is, however, probably useful only as an exercise in speculation.

Procedure

All female patients of our venereal disease clinic except those with imperforate hymens were given the usual examination and laboratory tests for venereal disease. In addition, two slides of specimens from each patient were prepared for cytology. One represented scrapings from the cervical os; the other, specimens from the vaginal pool of secretions. Both specimens were immediately placed in a fixative solution containing one-half ether and one-half alcohol. Ayer's wooden spatula was used to obtain both specimens.

Clinic nurses obtained most of the specimens. If the patient was far advanced in pregnancy or had observable disease, the clinic physician performed the procedure. After completion of the examination, the patient was informed that a cytological smear had been taken. Return appointments were arranged so that all test results could be given to the patient.

To obtain pertinent sexual histories from all

patients screened, two nurses experienced in contact interviewing were assigned to complete a specially prepared questionnaire during the patient's initial visit. Information thereby obtained was tabulated on IBM cards for use in describing the clinic population. Unmarried young girls, pregnant for the first time, were the only patients who objected to such interviewing. When such objections were encountered, only data from their clinical records were noted.

To reduce the variables in interpretation of cytological slides and in definitive diagnostic techniques, only two outside medical facilities were used. These were the University of Washington Hospital and the King County Hospital, both essentially under the direction of the university's medical school faculty. All slides were processed and interpreted by the pathology department of the university hospital.

Patients whose smears were interpreted as class IV (positive) were seen by the clinic physician on the return appointment. Immediate arrangements were made for hospitalization and definitive diagnosis. Cold knife conization of the cervix and curettage of the uterus were the standard procedures performed at both hospitals.

Women with class III (suspicious) cytological smears were scheduled for repeat smears. If the second examination also showed a class III reading, the patient was scheduled for conization of the cervix and dilation and curettage of the uterus. Complete hospital data on each patient were returned for our records. Responsibility for posthospital followup care remained with the patient and the hospital.

Patients who failed to keep return appointments at the clinic were of special concern to our staff of contact investigators. They were visited when possible by an investigator, who in many instances would bring the patient to the clinic or even to the hospital when admittance was required. In spite of this, a significant number of patients were lost from the study.

Results

Of 1,885 women screened for cancer of the cervix and uterus between September 1, 1961, and September 1, 1963, 36 who were in need of further tests or treatment were lost from study.

Table 4. Patients lost from study, by last cytological diagnosis

Last cytological diagnosis	Unable to locate	Further care or followup refused
Initial slides class I (negative), but repeats requested.....	10	-----
Unsatisfactory slides; repeats requested.....	14	1
Class III and IV cytological smears (suspicious and positive).....	9	2
Total.....	33	3

Table 4 shows the diagnostic status of these patients and causes of the failure in followup.

Obviously, the 11 lost patients (class III and IV smears) who had the highest risk of having cancer were our greatest concern. Interpolating from the experience of those patients who underwent definitive diagnostic tests, perhaps 5 of the 11 have early cancer—if they are still living.

The smears submitted from our clinic were unusual in some respects. The pathologist reported them challenging to interpret. Many of the patients screened had vaginitis and cervicitis. Also, at the time of screening, more than 30 percent had acute gonorrhea. The pathologist was nevertheless able to classify all but 7.6 percent of the cytological specimens without repeat slides. Most of the repeat smears had to be postponed until the patient was treated for her infection. In some instances it was difficult to free the patient of infection or perhaps reinfection.

Of the 1,849 patients with whom contact was maintained, 26 (1.4 percent) had hospital diagnostic studies performed as recommended on the basis of the cytological reports. These 26 patients were between 21 and 59 years of age. Their age distribution followed fairly closely the curve shown in the chart. Results of final diagnostic studies on the 26 by biopsy were:

<i>Final diagnosis (biopsy)</i>	<i>Number</i>
Negative for carcinoma.....	6
Hyperplasias or atypias.....	9
Cancer of the cervix, in situ.....	10
Cancer of the cervix, invasive.....	1
Cancer of the uterus or vagina.....	0

Calculated on the basis of 11 diagnosed and treated cancer patients for 1,849 patients screened, the prevalence rate in our study group was 6 per 1,000, compared with our arbitrarily set goal of 4 per 1,000. If the 5 probable cancer cases among those lost from study are added, the rate increases to 8.5 per 1,000, comparable to rates obtained from communitywide screening programs.

Discussion

Screening of special population groups for cancer of the cervix and uterus is probably more common than a review of the literature would indicate. Farrer and Tatham (5), reporting on a limited number screened in a venereal disease clinic in St. Thomas Hospital, London, concluded that such screening ought to be encouraged and adopted as routine procedure. Ferguson (6) pointed out in 1961 the significant yield of cancer in screening girls less than 19 years of age.

The concept of a "lost decade," described by Hester (7) in 1963, seems especially pertinent when considering ideal age groups for screening. If it is true that carcinoma in situ of the cervix is commonly present for 10 years or more before the invasive process begins, this latent period should be the most rewarding time to find such cases. Of the 11 cases of cancer detected in our limited program, 10 were in the in-situ stage; one patient (55 years of age) had early invasive carcinoma of the cervix.

The presence of vaginitis and cervicitis, as well as of gonorrhea, at time of screening for cancer presents diagnostic difficulties. Current treatment of venereal disease is geared to lessen the need for repeat visits. If the physician waits for results of treatment of the vaginitis or cervicitis, the opportunity to screen for cancer may be lost. Many patients do not return for post-treatment observation voluntarily. Conceivably, therapy such as douching could increase the number of false-negative reports.

Failure in necessary followup of patients with possible or diagnosed cancer undoubtedly will prove frustrating for any venereal disease clinic undertaking a cancer screening program. The majority of lost patients, in our experience, were never permanent residents of the community.

Those patients whom we were able to find understood the serious nature of cancer and appreciated the services organized to help them. The greatest responsibility of the clinic physician probably lies in persuading cancer suspects of the need for further diagnostic tests. Only two of our suspects refused further help, and this action was caused by fear in facing the prospect of cancer rather than by lack of interest.

Based on the total additional funds, \$11,000, we expended for this cancer detection program in the 2-year period, the cost of finding and bringing each new early case of cancer to adequate treatment was \$1,000. On the same basis, the cost of screening averaged a little more than \$5 per person screened.

It is difficult to predict whether the age of patients visiting venereal disease clinics will change with time. In the Seattle-King County clinic, venereal disease incidence has been increasing in younger age groups during the past 5 years; the trend may continue. The incidence rate of cancer in our clinic patients may therefore drop, but we will probably be able to follow patients over a greater interval if they become repeat visitors to the clinic. This longer period of observation should help assure that patients are diagnosed and treated early in the course of cervical carcinoma.

Breslow and Hochstim (8) have recently pointed out that the lower socioeconomic groups and minority groups use the Papanicolaou screening test to a far lesser extent than women in more favorable circumstances. Larger communities with adequate medical resources for cytological screening and followup care might well establish programs similar to ours to screen their indigent female population for cancer. The public venereal disease clinic should assume leadership in this direction.

As a case in point, in Seattle-King County, Indians represent less than 3 percent of the total population, yet 13 percent of the total women screened were Indians. The vast majority were medically indigent. This same group of Indian women (243) contributed 26 percent of the total suspicious slides, 23 percent of patients who had conization, and 18 percent of the diagnosed cancer cases. The total cancer cases are admittedly too small for any valid inferences, but the question of ethnic suscepti-

bility of Indian women to cancer of the cervix must be raised.

The cost of such screening programs will no doubt vary from one community to another, depending upon facilities available. Larger programs with central laboratory facilities, such as one carried on in British Columbia (9), are able to report a cost of about \$1.09 per person screened.

The total amount we spent in bringing each new case of carcinoma to treatment compares favorably with the present cost in our area of finding a new active case of tuberculosis. If one could project the possible expense to the community of terminal cancer care of these women, screening costs might well be considered a bargain.

In our estimation, the cancer screening program in our venereal disease clinic has been successful. It will be continued as long as our present arrangements with outside facilities for followup exist. Although our results showed no greater prevalence of cancer than communitywide programs have previously noted, this could be the result of screening a younger age group. Special efforts will be made to recheck every 6 months the nine patients who showed various degrees of atypia and metaplasia, conditions which warrant close followup.

Summary

In a cervical-uterine cancer screening program limited to women admitted to service in a venereal disease clinic in Seattle-King County, Wash., 1,885 women with a median age of 20 through 24 years were examined in a 2-year period. Two slides were prepared of specimens from the cervical os and the vaginal pool, obtained by the Ayer's wooden spatula technique. The presumptive prevalence rate of cancer was 8.5 per 1,000 women screened. Eleven (6.5 per 1,000) women were successfully followed and brought to treatment.

The public venereal disease clinic has an opportunity and an obligation to screen this special population group which gets little or no cancer prevention care. In these relatively young patients it is highly probable that cancer found will be noninvasive and amenable to effective treatment. Clinics need to include provision for

necessary followup in their planning since many patients have neither the motivation nor resources to do this for themselves.

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Program Notes

Continuous Mental Care

One of the greatest obstacles encountered in Alabama's continuous care program for the mentally ill has been a lack of funds for drugs. An appropriation by the last Alabama State Legislature from the 3 percent State tax on liquor distilleries will help finance drugs prescribed for mental patients who are unable to pay for them. Only a small sum will be available from the tax in 1964, but it is expected to be greater in future years.

Alabama's continuous care program has been extended from 3 counties in 1958 to 61 in 1964. Since it began, public health nurses have paid 23,289 visits to patients and families.

Fluoridation

Missing 6-year molars were 78 percent fewer in the 154 children of Cromwell, Conn., living in areas supplied since 1951 with fluoridated water than in the 98 town children drinking water from fluoride-deficient private wells. Local physicians observed little dental decay in the 154, an attitude of acceptance of fluoridation by the townspeople, and

"definitely no authenticated ill effect." (*Connecticut Health Bulletin*, May 1964.)

A campaign is underway to complete fluoridation of all public water supplies in West Virginia during 1964. Dr. N. H. Dyer, State health director, says 942,286 residents (83 percent of all persons served by public water supplies in the State) use fluoridated water. Nine communities started fluoridation during 1963; 37 communities still do not add fluorides to their water.

Parents Conference on PKU

The first meeting of Massachusetts Parents of PKU Children was recently held at the Children's Hospital Medical Center; 17 parents attended. Miss Ida Burwash of the center and of the PKU clinic staff discussed management of social problems in families with PKU children. In small discussion groups, the parents shared information and raised questions.

Approximately one-third of all cases of phenylketonuria discovered through the national screening program for PKU were found through the Massachusetts PKU detection

program instituted in July 1962, according to the Massachusetts Department of Public Health.

Specialization of Physicians

Full-time specialists comprise 69 percent of all active non-Federal physicians in the United States in 1964. For those in private practice the proportion is 61 percent. In 1931, full-time specialists made up 17 percent of the total.

Registration of Blood Banks

Under a new Illinois State act, all blood banks and clinical laboratories must register with the State department of public health. By June 1964, 572 facilities had registered; the remainder are being investigated.

Boys of 2 Accident Prone

Two-year-old boys experienced the highest accident rate (229 per 1,000) of any age-sex category in a 1-year study of more than 9,000 suburban children under age 7 in Rockland County, 30 miles north of New York City.

Women Examined for Cancer

More than 1,000 women in the Albany, N.Y., area were examined in the Albany Medical Center Cancer Detection Clinic during 1963; 42 of them had suspected malignancies. Doctors also diagnosed 79 benign tumors and 377 other major or minor pathological conditions requiring medical attention. The entire examination cost \$5 per patient.